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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

## Black Hills Ponderosa Pine

### Susceptible to Southwestern Dwarfmistletoe

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The reason for the absence of southwestern dwarfmistletoe (Arceuthobium vaginatum (Willd.) Presl f. cryptopodum (Engelm.) Gill) in the ponderosa pine (Pinus ponderosa Laws.) stands in the Black Hills of South Dakota has long been a subject of speculation. One possible explanation was that the ponderosa pine stands in this region might not be susceptible to the southwestern dwarfmistletoe. This possibility was remote, however, since Weir<sup>1</sup> had demonstrated that ponderosa pine from South Dakota was susceptible to the western dwarfmistletoe (A. campylopodum Engelm. f. campylopodum) from California.

A small-scale inoculation test was made in the greenhouse to determine whether ponderosa pine from the Black Hills was susceptible to A. vaginatum. Germinated dwarfmistletoe seeds of the 1960 seed crop were collected from the Roosevelt National Forest near Fort Collins, Colorado in October 1960, and placed on the twigs of five 5-year-old potted pines. Five seeds were planted on each tree. By October 1962, 2 infections on 2 trees had appeared. A severe infestation of aphids, which was later controlled, probably reduced

the rate of infection. The number and growth rate of the infections however, were comparable to those on ponderosa pines from several sources within the range of the parasite.

Ponderosa pine from the Black Hills is thus susceptible to A. vaginatum, so other factors are involved in the parasite's absence from this area. Isolation has been considered a factor, but this seems unlikely as the Black Hills pines are not completely dissociated from the main body of ponderosa pine in Colorado. Stands of this tree are scattered throughout eastern Wyoming and western Nebraska, and the species is even more widespread than indicated by the range map published by Curtis and Lynch.<sup>2</sup>

Climatic conditions of the more northern latitude seem to provide the most logical explanation for the absence of A. vaginatum in the Black Hills. Similar conditions must also prevail in Wyoming and Nebraska stands that intervene between the Black Hills and the known northern limit of this dwarfmistletoe in northern Colorado, a few miles south of the Wyoming border.<sup>3</sup> Studies to determine the

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exact northern limits of A. vaginatum and the factors affecting it are currently underway.

The lodgepole pine dwarfmistletoe (A. americanum Nutt.) and the limber pine dwarfmistletoe (A. campylopodum Engelm. f. cyanocarpum (A. Nels.) Gill) occasionally attack ponderosa pine in the Medicine Bow National Forest in southeastern Wyoming, but their damage is very minor compared to that

caused by A. vaginatum in Colorado and southward.

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<sup>1</sup>Weir, J. R. *Experimental investigations on the genus Razoumofskyia*. Bot. Gaz. 66: 1-31. 1918.

<sup>2</sup>Curtis, J. D., and Lynch, D. W. *Silvics of ponderosa pine*. U.S. Forest Serv. Intermountain Forest and Range Expt. Sta. Misc. Pub. 12, 37 pp. 1957.

<sup>3</sup>Hawksworth, F. G. *Dwarfmistletoe of ponderosa pine in the Southwest*. U.S. Dept. Agr. Tech. Bul. 1246, 112 pp. 1961.